Sai Bavisetty, Ph.D.

Department of Integrative Biology and Physiology | University of California, Los Angeles
(217)-693-9653 | venkatasainarayana@gmail.com

RESEARCH INTERESTS

Gene regulatory networks, Epilepsy Networks, Neuroscience, Topology, AI/ML

CURRENT POSITION

Postdoctoral Associate | University of California Los Angeles| CA | USA| Aug 1, 2025 - Present

EXPERIENCE

Postdoctoral Associate | University of Florida (UF) | Florida | USA| June 2024 – July 31, 2025

- Contributed to writing an Army Research Laboratory **BAA grant** proposal (in review)
- Co-organized a multi-university collaboration on modularity in complex biological systems
- Developed a repository of analytical tools for gene regulatory network analysis

Research Affiliate | Lawrence Berkeley National Laboratory | Berkeley, CA | Summer 2022

- Utilized **Topological Data Analysis** to design an **interpretable Generative Neural Network (GAN)** for **time series feature generation**
- Evaluated the impact of **feature engineering** using polynomial, logistic, and ridge regression, Random Forest, and XGBoost, achieving a **10% accuracy improvement** across multiple algorithms
- Developed tools for visualizing crystalline materials; optimized code using Vectorization to compute their persistent homology

SELECTED AWARDS

- **Susan C Morisato Scholarship** for leadership in undergraduate projects at Illinois Geometry Lab
- **Wolfgang Haken Prize** for outstanding thesis in Geometry and Topology
- **Collaboratory Fellow Award** for postdoctoral research in computational biology and bioinformatics
- **Landahl Travel Grant** to travel to annual meeting of Society for Math Biology
- **NITMB Travel Grant** to travel to the MathBio convergence workshop
- **NITMB Travel Grant** to travel to the Modularity in Biological Systems workshop

PUBLICATIONS

- V. S. N. Bavisetty, M. Wheeler, R. Laubenbacher, C. Kadelka (2025) Upper bound for the stability of Boolean networks. Physical Review E 112, 044310
  Highlighted in Physical Review
- V. S. N. Bavisetty, M. Wheeler, C. Kadelka (2025) Attractors are less stable than their basins: Canalization creates a coherence gap in gene regulatory networks. Submitted to PRX Life. Biorxiv: https://doi.org/10.1101/2025.11.06.687062
- Descent and the Picard group of Q(2). Thesis

EDUCATION

Ph.D. in Mathematics | University of Illinois Urbana-Champaign (UIUC) | May 2024 | GPA**:** 3.92/4.0

M.S. in Mathematics | Indian Institute of Technology Bombay (IITB) | Aug 2017 | GPA**:** 9.59/10.0

SKILLS

Languages: Python, C++, LaTeX, Julia, Linux, Bash, SQL, R

Mathematical modeling and Analysis: Gene regulatory networks, Epilepsy Networks, Statistical Analysis of Biological Data, Sensitivity Analysis, Multiscale modeling, Numerical optimization, Deep Learning, Computer

Vision, Generative AI, NLP, Topological Data Analysis, Feature Engineering, Model Optimization, Mechanistic modeling, Algorithm Design, System Design, Explainability, Hyperparameter Tuning
Soft Skills: Public Speaking, Technical Writing, Grant writing, Documentation, Leadership, Mentoring

DATA SCIENCE AND MACHINE LEARNING PROJECTS

Quant in a box | University of Illinois Urbana-Champaign | Spring 2024| Github | PyPi | Documentation

- Developed a high-performance **PyPI** package with a **multithreaded C++** backend, achieving a **10x speedup** in IEX market data parsing
- Collaborated with OneTick and Trading Technologies to build a market data pipeline for backtesting

Computer Vision and Machine Learning| University of Illinois Urbana-Champaign | Spring 2022

- Implemented **YOLO Loss** for object detection and trained on **PASCAL VOC** using Google Cloud
- Implemented Logistic Regression, Perceptron, and SVM classifiers with SGD

LEADERSHIP

- **Co-organizer**, Future Leaders Advancing in Math and Medicine Experience (FLAME) | April 2025
- Member**, Graduate Affairs Committee** | UIUC | Fall 2022
- **Co-organizer, Math Department TA training** | UIUC | Fall 2022
- **Organizer**, Graduate Geometry Learning Seminar | UIUC | Spring 2018
- **Organizer**, Graduate Student Homotopy Theory Seminar | UIUC | Fall 2020 - Spring 2021

UNDERGRADUATE RESEARCH EXPERIENCE

Research Mentor | Orlando Math Circle | Orlando | Fall 2024 – Spring 2025

[Multi-semester undergraduate research project. Title: Impact of network structure on the phenotypes of Gene regulatory networks]

Hoover Research Mentor | Illinois Geometry Lab | UIUC | Summer 2023

[Summer undergraduate research project. Title: Impact of Russia-Ukraine war on critical infrastructure]

Research Mentor | Illinois Geometry Lab | UIUC | Spring 2021 – Spring 2022

[Multi-semester undergraduate research project. Title: Modular Forms and homotopy of Q(2)]

RESEARCH VISITS

- Spectral Methods in Algebra, Geometry, and Topology
  Hausdorff Research Institute for Mathematics | Bonn | Fall 2022

INVITED TALKS

- Balancing Stability and Complexity in Boolean Models of Biological Systems | Math bio seminar, UCSD| Apr 2026
- Network Reorganization during ASM cycling | EBD Data Blitz, UCLA | Feb 2026
- Balancing Stability and Complexity in Boolean Models of Biological Systems | Cal Poly Colloquium, San Luis Obispo | Oct 2025
- Balancing Stability and Complexity in Boolean Models of Biological Systems | UCLA | Oct 2025
- Upper bound for robustness of a Boolean Network | UF | April 2025

PROFESSIONAL DEVELOPMENT WORKSHOPS

- Building Transformer-Based Natural Language Processing Applications
- Enhancing Data Science Outcomes with Efficient Workflow
- Data Parallelism: How to Train Deep Learning Models on Multiple GPUs
- Model Parallelism: Building and Deploying Large Neural Networks
- Bloomberg Market Concepts: An introduction to Financial Markets and Asset classes
- Wolfram for educator

EXPOSITORY TALKS

- Introduction to Boolean Networks | Cal Poly Student Colloquium | Cal Poly | Oct 2025
- Introduction to Boolean Networks | Nonlinear Controls and Robotics Lab | UF | Feb 2025
- Boolean Networks in Biology | Modularity Group | UF | Jan 2025
- Introduction to Q-Analysis | UF | Dec 2024

CONFERENCES AND WORKSHOPS

NITMB Math Bio convergence
NITMB | Chicago| Aug 2025

MEG-TREC 2025
University of Florida | Gainesville | Apr 2025

Southeast Center for Mathematics and Biology Symposium
Georgia Tech | Georgia | Apr 2025